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IMMUNIZATION AGAINST HEPATITIS A DURING AN OUTBREAK IN A JEWISH ORTHODOX COMMUNITY - QUEBEC, 1997-1998

Introduction

Hepatitis A outbreaks have been reported in some Jewish Orthodox communities in New York City and New York State[1-3]. The factors which lead to the transmission of the virus are known: families with a high proportion of children in the lower age groups, large numbers of children in schools which admit them at a very young age[3,4], and the close interaction between the various congregations within a region or between regions leading to the sporadic introduction of infection in the community[2].

The Jewish Orthodox community of two sectors of the island of Montreal numbers approximately 8,000 members and is divided into nine congregations. Members of this community are in close and frequent contact with members of other Jewish Orthodox communities, such as those of New York City. This article describes the first important outbreak in the Montreal community and the measures undertaken to control it.

Outbreak Description

Between 1 August 1997 and 31 May 1998, 28 cases of hepatitis A were reported to the *Direction de la santé publique de Montréal-Centre*. These cases were found to have occurred among members of the Jewish Orthodox community located in two sectors of the island of Montreal. At least four of the nine congregations were involved. The incidence rate was estimated at 420 per 100,000 person-years. This figure is much higher than the average annual incidence rate of hepatitis A in Quebec which is < 10 per 100,000 person-years (Dr. R. Dion, unpublished observations). These 28 cases were all confirmed by the presence of hepatitis A IgM type antibodies.

Fifteen of the cases were females and 13 were males. The median age was 12.5 years (ranging from 3 to 51 years). Children between 1 and 14 years of age accounted for 53.5% of the cases (Table 1). None of the cases were between the ages of 15 and 19. Persons ≥ 20 years of age accounted for 46.5% of the cases.

TABLE 1
Distribution of hepatitis A cases according to age and sex, Jewish Orthodox community, Montreal-Centre Region, August 1997 to May 1998

Age group	Number of cases according to sex			Proportion (%)
	Male	Female	Total	
< 1 year	—	—	0	0
1-4 years	2	—	2	7.1
5-9 years	6	3	9	32.1
10-14 years	2	2	4	14.3
15-19 years	—	—	0	0
20-24 years	—	5	5	17.9
25-29 years	2	3	5	17.9
30-34 years	—	1	1	3.6
≥ 35 years	1	1	2	7.1
Total	**13**	**15**	**28**	**100**
Proportion (%)	**46.4**	**53.6**	**100**	

The highest incidence rate occurred in adults between the ages of 25 and 34 (10.1 per 1,000 person-years) and the second highest incidence rate was among children between 5 and 14 years of age (6.5 per 1000 person-years) (Figure 1).

Figure 2 illustrates the temporal distribution of cases according to the date of onset of jaundice. The first six cases occurred between 1 August and 15 September. The first four were boys < 10 years of

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age from the W congre- gation. The boys had attended the same Jewish Orthodox school in Montreal and spent time in the same summer camp in the Laurentians north of Montreal. Two had been in contact with members of a New York Jewish Orthodox community during the 6 weeks prior to the onset of their respective infections. The fifth and sixth cases were a 29-year-old female and an 8-year-old boy, both members of two other congregations. One of the children of the fifth case attended a Jewish Orthodox daycare.

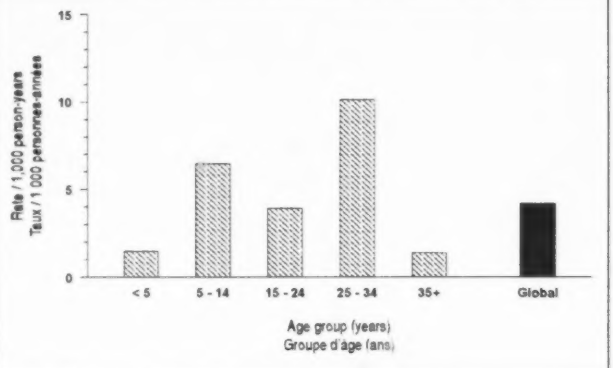
The next seven cases, occurring between 16 September and 25 November, were adults in their twenties – three females and two couples – six of whom were members of the W congregation. Evidence at that time suggested person-to-person transmission.

Of the next following seven cases, occurring between 26 November and 5 December, six were children between 5 and 14 years of age from three separate families. Two were the nephews of a 26-year-old day-care teacher, who was the second last case in this series. This cluster of cases likely reflects an increase of interpersonal contacts and a sharing of food and drink during the October Jewish holidays.

A further seven cases, occurring between 6 December 1997 and 9 February 1998, were between 9 and 42 years of age. The first of these was a 23-year-old female related to an adult case who was sick 1 month previously, but had never had contact with the latter. Four cases attended two schools in which at least one case had already been diagnosed. The last two cases in this series were 32 and 42 years of age, respectively, and had no prior contact with any of the known cases.

The final case, occurring on April 6, was a 51-year-old female who had contact with an unvaccinated child.

Figure 1
Hepatitis A incidence rate* by age group, Jewish Orthodox community, Montreal-Centre Region, August 1997 to May 1998

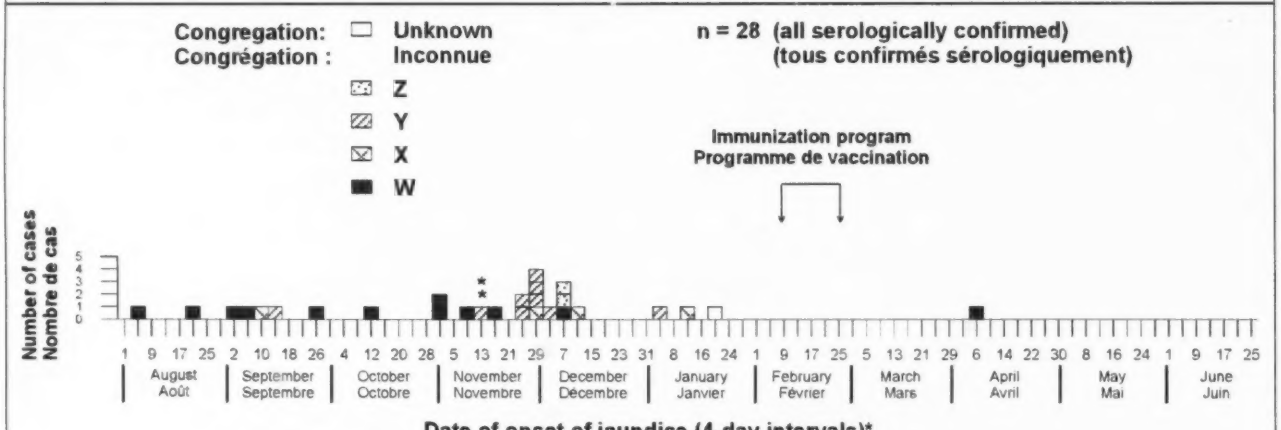


* Denominator estimation from Shahar C, Weinfeld M, Schnoor RF. *Survey of the hassidic and Ultra-Orthodox Communities in Outremont and surrounding areas.* Montreal, QC: COHO (Coalition of Outremont Hassidic Organizations), 1997.

Public-Health Intervention

As each case was declared, an epidemiologic investigation was initiated and immunoglobulin was administered to any close

Figure 2
Hepatitis A cases, Jewish Orthodox Community, Montreal-Centre Region, Quebec, August 1997 to June 1 998



* or date when first symptoms appeared or blood sample taken for serology
** Spouse a member of W congregation

TABLE 2
Vaccine coverage against hepatitis A (at least 1 dose) in Jewish Orthodox schools, Montreal-Centre Region, February 1998

School	Level						Total	
	Preschool and Daycare		Primary		Secondary			
	n / N	Proportion (%)	n / N	Proportion (%)	n / N	Proportion (%)	n / N	Proportion (%)
A	112/141	79.4	193/197	98.0	127/156	81.4	432/494	87.5
B	56/60	93.3	141/152	92.8	63/89	70.8	260/301	86.4
C	77/79	97.5	76/81	93.8	—	—	153/160	95.6
D	22/25	88.0	74/86	86.1	22/25	88.0	118/136	86.8
E	117/134	87.3	134/141	95.0	95/100	95.0	346/375	92.3
F	87/91	95.6	148/180	82.2	66/85	77.6	301/356	84.6
G	27/29	93.1	85/112	75.9	38/49	77.6	150/190	78.9
H	47/60	78.3	71/105	67.6	16/30	53.3	134/195	68.7
I	52/55	94.5	201/207	97.1	155/179	86.6	408/441	92.5
J	30/30	100.0	178/185	96.2	105/106	99.1	313/321	97.5
K	44/92	47.8	95/97	97.9	48/57	84.2	187/246	76.0
L	47/48	97.9	139/139	100.0	48/55	87.3	234/242	96.7
M	63/64	82.8	—	—	—	—	53/64	82.8
TOTAL	**771/908**	**84.9**	**1,535/1,682**	**91.3**	**783/931**	**84.1**	**3,089/3,521**	**87.7**

n: number of individuals having received at least one dose of hepatitis A vaccine
N: number of individuals registered

contacts when the time between the most recent contact with an infected person had been ≤ 14 days.

Since the four boys who were initially reported were from the same congregation and had attended the same school, immunoglobulin and hepatitis A vaccine was offered to all students and teachers at that school in September 1997. The vaccine was also offered to the female students and teachers of another school whose members belonged to the same congregation as the students (mainly siblings of the first school) and had been in close contact with them.

Despite these actions, transmission of the virus persisted within the community and it was deemed necessary to initiate a vaccination program against hepatitis A in an attempt to stop the existing outbreak and to prevent any medium- and long-term recurrence. At the end of November 1997, a request was submitted to the *ministère de la Santé et des Services sociaux du Québec* for sufficient vaccine to immunize the children of this community. Following the advice of a group of experts, the *ministère* released sufficient vaccine to immunize all of the 1- to 17-year-old members of a community whose total number was estimated to be 3,900. The intention was to administer at least one dose of the vaccine to 90% of the members of the target group.

Most of the vaccination clinics were held in local schools attended by most of the children who were often as young as 2.5 years. Many of these schools provide daycare for even younger children. The vaccinations were carried out from 9-25 February 1998. Vaccines were administered by the *Centre Local de Services Communautaires* (CLSC) *Côte-des-Neiges* in cooperation with the CLSC *Saint-Louis-du-Parc* and the *Direction de la santé publique de Montréal-Centre*. Parents were contacted by a Jewish Orthodox community organization and volunteered their time to help organize the clinics and recruit the preschoolers.

In all, 87.7% of the school children were vaccinated. The coverage varied between 68.7% and 97.5%, depending on the school. Coverage was 84.9%, 91.3%, and 84.1% at the preschool level (ages 1 to 5 years approximately), primary level (ages 6 to 12 years approximately), and secondary level (ages 13 to 17 years approximately), respectively (Table 2). Also, 271 children outside of these schools were vaccinated, and 35 children who were part of the targeted population but attended schools outside of the two targeted CLSCs.

To ensure long-term prevention, a program of routine vaccination against hepatitis A will soon be introduced so that children in this community can receive an initial dose of vaccine without charge at 12 months of age and a booster at 18 months of age.

Discussion

This was the first documented widespread outbreak of hepatitis A in the Jewish Orthodox community in the region of Montreal. Other than a sporadic case occurring in April 1997 in an 11-year-old

female and another in an 18-year-old male reported in December 1996, the most recent cases in this community date back several years involving a few clusters of cases.

A number of the children of the adult cases in October and November 1997 had been immunized against hepatitis A in September. It is therefore possible that some of these children had developed an asymptomatic infection which was already in its incubation stage at the moment of immunization. Some of the adult cases had likely acquired a secondary infection from these belatedly immunized children. It is also possible that very young children at home, not having been vaccinated, had passed along the infection to their parents, while only acquiring a subclinical infection themselves. In fact, between 70% and 95% of the children < 5 years of age infected with hepatitis A present an anicteric infection[5,6].

The administration of immunoglobulin to close contacts of reported cases did not interrupt the transmission of hepatitis A through a number of generations of cases. Also, according to the literature, even if immunoglobulin does have some effect on the transmission of disease through family contact, it generally does not succeed in preventing the spread to a community plagued by an outbreak[7,8] unless it is administered to a large segment of that community[9,10].

A study has shown that it is possible to contain, within 4 to 8 weeks, an outbreak of hepatitis A in a community by vaccinating 80% of susceptible persons[7]. During an outbreak of hepatitis A in a socially isolated religious community in a rural region of southern Ontario, no new case was identified in the 8 weeks following the vaccination of 69% of its members between 2 and 45 years of age[11].

In a situation similar to the one described in this report, the literature mentions recurrent outbreaks of hepatitis A in Jewish Orthodox communities. In New York City, two major outbreaks were reported in 1991 and 1995 in the Jewish Orthodox community of Brooklyn (incidence rate of 157 and 243 cases per 100,000 persons, respectively)[1]. At the time of the 1995 outbreak, individuals < 20 years of age accounted for 57% of the cases. A free vaccination program against hepatitis A for school-age children in this community was initiated and maintained; since then, the situation seems to have been kept under control (Dr. M. Layton, New York City Department of Health, New York: personal communication, 1997).

The scientific literature refers specifically to the Jewish Hassidic community of Kiryas Joel in Monroe County, New York State, where outbreaks of hepatitis A with high incidence rates have occurred regularly[2,4]. One of the initial studies of the efficacy of an inactivated vaccine against hepatitis A was undertaken in this community in 1991[4]. During the study, no cases of hepatitis A were detected among the group of children receiving the vaccine after 21 days or more, as opposed to 34 cases among those receiving a placebo. The efficacy, as measured 50 days following immunization, was 100%. No cases have been detected among those vaccinated during 6 years of follow-up in spite of outbreaks in neighbouring communities whose residents had not been vaccinated[12].

Conclusion

The immunization campaign described above appears to have put an end to the active transmission of hepatitis A within this community; in the 14 weeks since its occurrence, only one case has been reported – a 51-year-old female who had been in contact with her unvaccinated 1-year-old grandson. We do not know how such an outbreak would have evolved had the immunization campaign not been carried out. On the other hand, the risk of recurring transmission of hepatitis A is greatly reduced by a high level of vaccination coverage in schools and will be further reduced by implementating a routine vaccination program in children aged 12 to 18 months. One of the factors contributing to the success of the campaign was the community involvement in its planning and operation.

Acknowledgements

We would like to thank all those who participated in the above undertaking and especially the professionals of the Infectious Disease Unit of the *Direction de la santé publique de Montréal-Centre*, the personnel from the CLSC *Côte-des-Neiges* and the CLSC *Saint-Louis-du-Parc*, Mrs. Carol Polter of the social services centre AHAVAS CHESED, school principals, parent volunteers, Mr. Alex Werzberger and Mrs.Channa Werzberger of the Coalition of Hassidic Organizations of Outremont, and the rabbis of the communities involved. We would also like to thank the community doctors who reported the cases and the *ministère de la Santé et des Services sociaux du Québec* who provided the vaccine. Finally, we wish to thank Dr. Marcelle Layton of the New York City Department of Health and Dr. Stanley Kondracki of the New York State Department of Public Health for the information they kindly provided.

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Source: *D Deshaies, MD, R Dion, MD, L. Valiquette, MD, MSc, Direction de la santé publique, Régie régionale de la Santé et des Services sociaux de Montréal-Centre, N Auger, MD, Programme de résidence de l'Université McGill, Montreal QC.*

Editorial Comment

This report is another example of hepatitis A vaccine being used in an attempt to control a community outbreak of hepatitis A in Canada. Substantial immunization rates were achieved in this program as the result of close collaboration with the affected community. However, this report does not provide strong evidence that the vaccination program, as instituted, was responsible for the lack of cases after the program; incidence may already have been declining when the program was administered. The precise place of hepatitis A vaccine in outbreak control is still evolving.

Announcement

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16–17 November 1998
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This 2-day conference, sponsored by the Ontario Ministry of Health, is to provide advanced information on tuberculosis (TB) to health-care providers from across the nation. Participants will have the opportunity to listen, learn, and discuss issues with leading health professionals in the field of TB management. Medical, public-health and community perspectives will be presented. Among the topics to be discussed are epidemiology of TB, TB in high-risk groups, future directions in research, multi-drug resistance, ethic and legal issues, chemoprophylaxis, management of difficult cases, diagnostic testing, and HIV co-infection

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Erratum

HAEMOPHILUS INFLUENZAE TYPE B DISEASE AT 11 PEDIATRIC CENTRES, 1996-1997
Vol. 24-13, pages 107 and 108

IMPACT investigators and participating centres listed under the **Achnowledgements** on page 107 should have been included under the **Source** on page 108. The **Source** should read as follows:

S Grewal, Department of Pediatrics, The University of British Columbia, Vaccine Evaluation Center, British Columbia's Children's Hospital, D Scheifele, MD, Vaccine Evaluation Center, British Columbia's Children's Hospital, Vancouver BC, on behalf of IMPACT; investigators and participating centres include R Morris, MD, Dr Charles A. Janeway, Child Health Centre, St. John's, NF; S Halperin, MD, IWK Grace Health Centre, Halifax, NS; P Déry, MD, le Centre hospitalier universitaire de Québec (Pavillon CHUL),Quebec, E Mills, MD, Montreal Children's Hospital, Montreal, M Lebel, MD, Hôpital Sainte-Justine pour les enfants, Montreal, QC; N MacDonald, MD, Children's Hospital of Eastern Ontario, Ottawa, E Wang, MD, The Hospital for Sick Children, Toronto, ON; B Law, MD, Health Sciences Centre, Winnipeg, MB; T Jadavji, MD, Alberta Children's Provincial General Hospital, Calgary, W Vaudry, MD, Royal Alexandra and University of Alberta Hospitals, Edmonton, AB; G Delage, MD, CPS Liaison, P Duclos, DVM, PhD, LCDC Liaison.

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